Public Abstract

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Title:SELECTED TECHNIQUES FOR VEHICLE TRACKING AND ASSESSMENT IN WIDE AREA MOTION IMAGERY

Tracking of vehicles in wide area motion imagery (WAMI) is very important for civilian and military surveillance. Tracking in a dataset that is characterized by very large format video with an extremely wide field -of-view (covering few to tens of square miles), and with very minimal ground resolution (images taken at about 4000ft to 5000ft above ground) and with low frame rates (1-10 frames/ sec), is a very challenging job. Currently, analysts spend many hours manually tracking vehicles using this data. Efforts are underway to automate this tracking process, starting from region of interest selection to generating the track produced by the vehicle. This research describes some of the techniques and approaches taken towards developing a low frame rate automatic and assisted vehicle tracking system and also develops a performance evaluation system for low frame rate tracker. One approach that is taken on this challenging dataset is extracting roads from these images using the geo-registered property of the data. This makes the car detection algorithms using Bayesian approach run considerably faster and efficiently. Also, car tracking algorithms can use this apriori knowledge of roads. The car tracking algorithm using Camshift has been further modified/improved, customizing it to track cars better in this dataset. A performance evaluation system developed in this research can be used for measuring the performance improvement of the tracker as it advances over the coming years. It can also be used for parameter tuning. This performance evaluation system can be used for testing the tracker performance using two approaches, the approach using gaps and approach using tracklets. Both of these frameworks are developed using information theoretics measures and non-information theoretic measures.